

AMENDMENT TO THE CLAIMS

Pursuant to 37 C.F.R. § 121, the following claims replace all prior versions and listings of claims in the Application.

LISTING OF CLAIMS

Please replace original claims 1-48 with the following claims:

1. (Currently Amended) A method for ~~imaging~~enhancing an image of one or more ~~features~~attributes representing a property of an object, ~~the object comprising multiple attributes, the method comprising~~which comprises the steps of:

selecting a first attribute and a second attribute from ~~the~~ multiple attributes, the first attribute and the second attribute each having its own vertices;

creating a normal map using at least one of the first and second attributes, the normal map having its own vertices;

converting the normal map vertices and the vertices of the at least one of the first and second attributes used to create the normal map into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map; and

combining an ambient lighting component with the diffuse lighting component and at least one of the first and second attributes to form an enhanced image

~~representing a select feature of the object that is substantially indistinguishable in its natural environment~~representing at least one property of the object.

2. (Original) The method of claim 1, wherein at least one of the first attribute and the second attribute comprise a combination of two or more attributes.

3. (Original) The method of claim 2, wherein the combination of two or more attributes form a hybrid attribute.

4. (Original) The method of claim 2, wherein the first attribute comprises any combination of two or more attributes comprising amplitude, frequency, phase, power, semblance, coherency, dip, azimuth, gradient, fluid factor, acoustic impedance, velocity, pressure, porosity, permeability, stratigraphy and lithology and the second attribute comprises at least one attribute from amplitude, frequency, phase, power, semblance, coherency, dip, azimuth, gradient, fluid factor, acoustic impedance, velocity, pressure, porosity, permeability, stratigraphy and lithology.

5. (Original) The method of claim 1, wherein the ambient lighting component and diffuse lighting component are combined with the first attribute and the second attribute is used to create the normal map.

6. (Original) The method of claim 1, wherein the ambient lighting component and the diffuse lighting component are combined with the first attribute and the first attribute is used to create the normal map.

7. (Currently Amended) The method of claim 1, further comprising the steps of:

selecting a third attribute, the third attribute having its own vertices;
creating another normal map using at least one of the first, second and third attributes, the another normal map having its own vertices;
converting the another normal map vertices and the vertices of the at least one of the first, second and third attributes used to create the another normal map into another matrix representing another tangent space normal map;
calculating another diffuse lighting component from the another tangent space normal map and the at least one of the first, second and third attributes used to create the another normal map; and
combining the ambient lighting component with the another diffuse lighting component and at least one of the first, second and third attributes to form another ~~image representing a select feature of the object~~enhanced image representing another property of the object.

8. (Original) The method of claim 7, wherein the third attribute comprises the combination of the ambient lighting component, the diffuse lighting component and the at least one of the first and second attributes.

9. (Currently Amended) The method of claim 8, wherein the another normal map is created using at least one of the first and second attributes and the third attribute is

combined with the ambient lighting component and the another diffuse lighting component to form the another enhanced image.

10. (Currently Amended) The method of claim 8, wherein the another normal map is created using the third attribute and the third attribute is combined with the ambient lighting component and the another diffuse lighting component to form the another enhanced image.

11. (Currently Amended) The method of claim 1, further comprising the step of displaying at least a portion of the enhanced image to a user.

12. (Currently Amended) The method of claim 11, wherein the enhanced image displayed is displayed on at least a portion of one of a plurality of planar surfaces defining a probe.

13. (Currently Amended) The method of claim 11, wherein the enhanced image displayed is displayed at least partially within a plurality of planar surfaces defining a probe.

14. (Previously Presented) The method of claim 1, wherein the first attribute and the second attribute each comprise multiple data values and associated spatial coordinates, each data value having a three-dimensional spatial coordinate.

15. (Original) The method of claim 14, wherein the normal map comprises multiple perturbed normal vectors that are derived from the cross product of a vertical component and a horizontal component for each data value.

16. (Original) The method of claim 1, wherein a vertex program is used to convert the normal map vertices and the vertices of the at least one of the first and second attributes used to create the normal map into the matrix representing the tangent space normal map.

17. (Original) The method of claim 1, wherein the diffuse lighting component and the ambient lighting component are each calculated using a register combiner.

18. (Currently Amended) The method of claim 17, wherein the ambient lighting component, the diffuse lighting component and the at least one of the first and second attributes are combined using the register combiners to form the enhanced image.

19. (Original) The method of claim 1, wherein the first attribute and the second attribute comprise medical data.

20. (Original) The method of claim 1, wherein the first attribute and the second attribute comprise seismic data.

21. (Original) The method of claim 1, wherein the ambient lighting component is a predetermined constant.

22. (Currently Amended) The method of claim 1, further comprising the steps of:

calculating a specular lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map; and

combining the specular lighting component, the ambient lighting component, the diffuse lighting component and the at least one of the first and second attributes to form the enhanced image.

23. (Currently Amended) The method of claim 1, further comprising the steps of:

applying an imaginary light source to the enhanced image;

displaying a portion of the enhanced image to a user;

interactively repositioning at least one of the imaginary light source and the displayed enhanced image relative to a line of sight of the displayed enhanced image to the user; and

repeating the last three steps in claim 1.

24. (Currently Amended) A method for enhancing an image of ~~imaging a select feature~~ one or more attributes representing a property of an object that is substantially indistinguishable in its natural environment, the object comprising multiple attributes, the method comprising which comprises the steps of:

selecting an attribute from ~~the~~ multiple attributes, the attribute having its own vertices;

creating a normal map using the attribute, the normal map having its own vertices;

converting the normal map vertices and the vertices of the attribute into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the attribute; and

combining an ambient lighting component with the diffuse lighting component and the attribute to form an enhanced image ~~representing the select feature of the object~~ representing at least one property of the object.

25. (Currently Amended) A method for ~~imaging~~ enhancing an image of one or more features ~~multiple attributes representing a property of an object, the object comprising multiple attributes, the method comprising~~ which comprises the steps of:

selecting a first attribute and a second attribute from the multiple attributes, the first attribute and the second attribute each having its own vertices;

creating a normal map using at least one of the first and second attributes, the normal map having its own vertices;

converting the normal map vertices and the vertices of the at least one of the first and second attributes used to create the normal map into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map;

combining an ambient lighting component with the diffuse lighting component and ~~at least one of the first and second attributes to form an enhanced image representing a select feature of the object of the first and second attributes;~~ and displaying at least a portion of the enhanced image to a user, the portion of the displayed enhanced image comprising at least part of the first attribute and part of the second attribute.

26. (Currently Amended) The method of Claim 25, wherein the ~~select feature~~first and second attributes of the object is substantially indistinguishable in its natural environment~~represent a geophysical property of the object.~~

27. (Currently Amended) A system comprising a program storage device readable by a machine, the storage device embodying a program of instructions executable by the machine for enhancing an image of imaging one or more features-attributes of representing a property of an object,~~the object comprising multiple attributes,~~ the instructions comprising the steps of:

selecting a first attribute and a second attribute from multiple attributes, the first attribute and the second attribute each having its own vertices;

creating a normal map derived from at least one of the first and second attributes, the normal map having its own vertices;

converting the normal map vertices and the vertices of the at least one of the first and second attributes used to create the normal map into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map; and
combining an ambient lighting component with the diffuse lighting component and at least one of the first and second attributes to form an enhanced image ~~representing a select feature of the object that is substantially indistinguishable in its natural environment~~ representing at least one property of the object.

28. (Original) The system of claim 27, wherein at least one of the first attribute and the second attribute comprise a combination of two or more attributes.

29. (Original) The system of claim 28, wherein the combination of two or more attributes form a hybrid attribute.

30. (Original) The system of claim 28, wherein the first attribute comprises any combination of two or more attributes comprising amplitude, frequency, phase, power, semblance, coherency, dip, azimuth, gradient, fluid factor, acoustic impedance, velocity, pressure, porosity, permeability, stratigraphy and lithology and the second attribute comprises at least one attribute from amplitude, frequency, phase, power, semblance, coherency, dip, azimuth, gradient, fluid factor, acoustic impedance, velocity, pressure, porosity, permeability, stratigraphy and lithology.

31. (Original) The system of claim 27, wherein the ambient lighting component and the diffuse lighting component are combined with the first attribute and the second attribute is used to create the normal map.

32. (Original) The system of claim 27, wherein the ambient lighting component and the diffuse lighting component are combined with the first attribute and the first attribute is used to create the normal map.

33. (Currently Amended) The system of claim 27, further comprising the steps of:

selecting a third attribute, the third attribute having its own vertices;

creating another normal map derived from at least one of the first, second and third attributes, the another normal map having its own vertices;

converting the another normal map vertices and the vertices of the at least one of the first, second and third attributes used to create the another normal map into another matrix representing another tangent space normal map;

calculating a diffuse lighting component from the another tangent space normal map and the at least one of the first, second and third attributes used to create the another normal map; and

combining the ambient lighting component with the another diffuse lighting component and at least one of the first, second and third attributes to form another enhanced image representing a select feature another property of the object.

34. (Original) The system of claim 33, wherein the third attribute comprises the combination of the ambient lighting component, the diffuse lighting component and the at least one of the first and second attributes.

35. (Currently Amended) The system of claim 34, wherein the another normal map is created using at least one of the first and second attributes and the third attribute is combined with the ambient lighting component and the another diffuse lighting component to form the another enhanced image.

36. (Currently Amended) The system of claim 34, wherein the another normal map is created using the third attribute and the third attribute is combined with the ambient lighting component and the another diffuse lighting component to form the another enhanced image.

37. (Currently Amended) The system of claim 27, further comprising the step of displaying at least a portion of the enhanced image on a monitor to a user.

38. (Currently Amended) The system of claim 27, wherein the first attribute and the second attribute each comprise multiple data values and corresponding spatial coordinates, each data value having a three-dimensional spatial coordinate[[]].

39. (Original) The system of claim 38, wherein the normal map comprises multiple perturbed normal vectors that are derived from the cross product of a vertical component and a horizontal component for each data value.

40. (Original) The system of claim 27, wherein the first attribute and the second attribute comprise medical data.

41. (Original) The system of claim 27, wherein the first attribute and the second attribute comprise seismic data.

42. (Original) The system of claim 27, wherein the ambient lighting component is a predetermined constant.

43. (Currently Amended) The system of claim 27, further comprising the steps of:

calculating a specular lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map;
and

combining the specular lighting component, the ambient lighting component, the diffuse lighting component and the at least one of the first and second attributes to form the enhanced image.

44. (Currently Amended) The system of claim 27, further comprising the steps of:

applying an imaginary light source to the enhanced image;

displaying a portion of the enhanced image to a user;

interactively repositioning at least one of the imaginary light source and the displayed enhanced image relative to a line of sight of the displayed enhanced image to the user; and
repeating the last three steps in claim 27.

45. (Currently Amended) A system comprising a program storage device readable by a machine, the storage device embodying a program of instructions executable by the machine for ~~imaging~~ enhancing an image of one or more attributes representing a property ~~a select feature of an object that is substantially indistinguishable in its natural environment, the object comprising multiple attributes,~~ the instructions comprising the steps of:

selecting an attribute from ~~the~~ multiple attributes, the attribute having its own vertices;

creating a normal map derived from the attribute, the normal map having its own vertices;

converting the normal map vertices and the vertices of the attribute into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the attribute; and

combining an ambient lighting component with the diffuse lighting component and the attribute to form an enhanced image representing ~~the select feature of the object~~ at least one property of the object.

46. (Currently Amended) A system comprising a program storage device readable by a machine, the storage device embodying a program of instructions executable by the machine for enhancing an image of ~~imaging one or more features~~ multiple attributes representing a property of an object, ~~the object comprising multiple attributes~~, the instructions comprising the steps of:

selecting a first attribute and a second attribute from the multiple attributes, the first attribute and the second attribute each having its own vertices;

creating a normal map derived from at least one of the first and second attributes, the normal map having its own vertices;

converting the normal map vertices and the vertices of at least one of the first and second attributes used to create the normal map into a matrix representing a tangent space normal map;

calculating a diffuse lighting component from the tangent space normal map and the at least one of the first and second attributes used to create the normal map;

combining an ambient lighting component with the diffuse lighting component and ~~at least one of the first and second attributes~~ to form an enhanced image of the first and second attributes ~~representing a select feature of the object~~; and

displaying at least a portion of ~~the~~ the enhanced image to a user, the portion of the displayed enhanced image comprising at least part of the first attribute and part of the second attribute.

47. (Withdrawn)

48. (Withdrawn)